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SCIENCE NEWS LETTER

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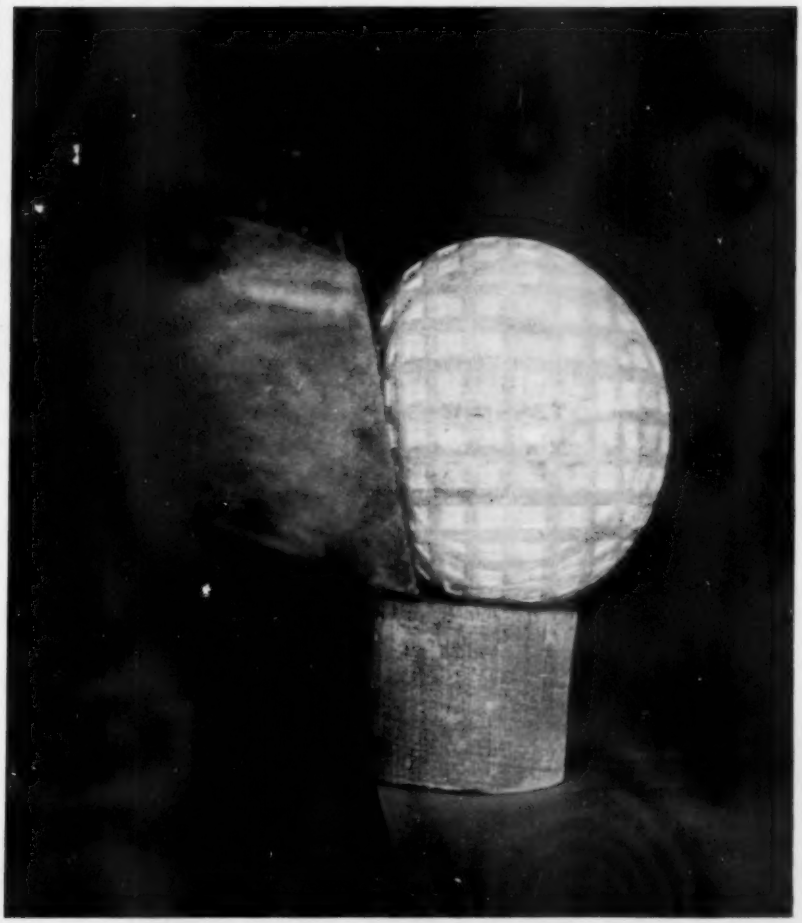
THE WEEKLY SUMMARY OF CURRENT SCIENCE •



DECEMBER 3, 1932

"Knocking It Sideways"

See page 354

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The Weekly Summary of Current Science

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Edited by WATSON DAVIS

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? DO YOU KNOW THAT ?

An entire city block of model homes is being built on the fourth floor of a St. Paul department store.

The first European animal to be introduced into New Zealand was the pig, brought by Captain Cook in 1773.

Dairy specialists have developed a dry air sterilizing process for milk cans and utensils, said to be better than the steam method.

Stainless steel will find a new usefulness in making dental crowns and bridges, if "modernistic" teeth produced in Germany find favor.

An aviator riding 10,000 feet above the earth can see the sunrise more than ten minutes before it is seen by a man on the ground directly beneath him.

Avocado fruit requires several days in which to soften after it is picked, and experimenters find that this storage temperature should be not lower than 45 degrees Fahrenheit.

From crude petroleum no less than 260 products, ranging from asphalt to chewing gum, are obtained.

The Soviet Union has formed a committee to take charge of protection and restoration of historic monuments in Russia.

Baby diamond-back terrapins that were fed through their first winter, instead of hibernating, gained a year's growth.

A rubber company announces as something new in tire improvements a rubber covered valve for automobile tire tubes.

Two new uses for milk sugar have been found, presenting a strong contrast: one is in certain kinds of confectionery and the other in explosives.

Using a metallic "sponge" to soak up the Vitamin A, a chemist of Oberlin College has succeeded in isolating this vitamin from halibut liver oil.

WITH THE SCIENCES THIS WEEK

Curiosity arousing questions for the teacher and general reader. Book references in italic type are not sources of information of the article, but are references for further reading. Books cited can be supplied by Librarian, Science Service, at publisher's price, prepaid in U. S.

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COSMOGONY

Super-Radium Supplied Energy For Rapid Cosmic Evolution

Its Wasted Fragments Now Our Most Potent Radioactive Elements; Its Wandering Rays Part of Cosmic Radiation

SUPER-RADIUM, a hypothetical element or group of elements resembling radium but with vastly greater energy content, whose wasted fragments are now our most potent radioactive elements and whose wandering rays, at large in the universe for ten thousand million years, are the much-discussed cosmic rays, formed part of the picture of the world "in the beginning" as delineated by the noted young Belgian physicist, the Abbé G. Lemaitre of the University of Louvain, in an address at the Johns Hopkins University.

Might Explain Discrepancies

Such a hypothetic element might help explain the present discrepancies between the apparent age of the earth as calculated by the newer school of mathematical physics and the seemingly much greater age demanded by modern astronomy. The universe seems to be rushing apart with almost incredible yet constantly increasing speed, the Abbé Lemaitre said. The most distant nebulae we can see are apparently receding at a velocity one-fifteenth that of light, or twelve thousand miles a second; nearer nebulae are running away at lesser rates. Mathematical considerations based on these phenomena by such modern physicists as Prof. Einstein, Dr. Willem de Sitter of Holland, and the Abbé Lemaitre himself lead to the conclusion that this cosmic dispersal has been going on for about two thousand million years.

Astronomers Not Satisfied

But two thousand million years is not enough time to satisfy the astronomers. This little pebble of an earth which we ourselves inhabit is at least that old, if calculations based on the rate of radioactive radiation from ancient rocks are to be trusted. The stars must surely be much more ancient than the planets that attend them.

As a way out of this dilemma, the Abbé Lemaitre suggested that the evolution of the universe went on at a much faster rate in the days of its flaming youth, and that the energy with which it was then literally bursting may have come from radioactive elements much more massive and much more active than radium itself.

Projecting the story of his ever-expanding universe back into the past, like a motion picture film run backwards, the Abbé Lemaitre visioned a beginning-point when neither time nor space existed—when the whole universe as we partly know it today, spread across the diameter of millions of light-years, was all potentially contained in a single atom: a thing of no dimension, as we measure space, but massive enough and containing energy enough to furnish forth the uncountable billions of suns that since that movement have been rushing apart to the uttermost bounds of the cosmos. In a paper before the American Physical Society meeting at the University of Chicago, Prof. Lemaitre tied in his theory of a "superatomic" origin of the universe with recently observed facts about cosmic rays. Using the idea that cosmic rays are affected by the magnetism of the earth, just as electrons from the sun cause the aurora in in polar regions where magnetism is strong, Prof. Lemaitre has evolved a mathematical theory that shows that electrons of ten thousand million volts cannot reach the earth's surface at the equator. The great earth-magnet pulls the electrified particles into streams over the two ends of the earth. Prof. M. S. Vallarta of Massachusetts Institute of Technology collaborated in this theory with Prof. Lemaitre.

Science News Letter, December 3, 1932

EDUCATION-PHOTOGRAPHY

Talking Movies Become New Educational Tool

TWO ten-minute talking motion picture films, released by the University of Chicago, represent the entrance of the "talkies" into the university and high school classroom.

The films, called Oxidation and Reduction and The Molecular Theory of Matter, are said to provide in 20 minutes a presentation ordinarily requiring five or six hours in the classroom. They are dramatically illustrated with raging forest fires, burning oxyhydrogen blow torch and glowing coke oven. Apparatus found only in the best equipped universities is used and the voice of a master teacher explains the action of the experiments. Time-lapse and microscopic photography and animated drawings add to the effectiveness of the pictures.

Three other physical science subjects are now being "shot" as a part of a course of 20 films. Such courses are also planned for the biological and social sciences and the humanities.

Dr. Robert M. Hutchins, president

IN THE CLASSROOM

A machine gunner spatters a metal plate with bullets to explain the molecular theory of matter—striking illustration brought to the classroom with the new educational talkies.

of the University of Chicago, says: "We believe that talking films properly prepared and integrated with printed instructional material will contribute greatly to the effectiveness of our new general courses for freshmen and sophomores. . . . These films will be available to any high school, college, university or adult educational group in the country. . . ."

Erpi Picture Consultants, subsidiary of Western Electric Co., cooperated in the production of the pictures.

Science News Letter, December 3, 1932

CHEMISTRY

Neuton, Element Zero, May Gain Place in Periodic Table

Made up of Neutrons, a Thimbleful of it Would Weigh A Million Tons; But it Will Never be Thus Concentrated

WHEN the neutron was detected this year at the famous Cavendish Laboratory at Cambridge, England, it was not heralded as the discovery of a new chemical element.

Yet it can be so considered, and Dr. W. D. Harkins, the University of Chicago chemist, has suggested to the National Academy of Sciences that this remarkable new kind of matter should be recognized as a chemical element of atomic number zero and that it should be accorded a secure place in the list of chemical elements.

Just last year the last undiscovered two of the ninety-two chemical elements were discovered by the American chemist Allison and named after two American states, alabamine and virginium. Chemists thought that all possible elements had been found. But they had forgotten that there might be a building block of matter without electrical charge which nature uses in atom building and which might be considered an element itself.

Twelve years ago Dr. Harkins and Lord Rutherford, working independently, suggested the existence of the neutron and predicted its properties. Just as the neutron was experimentally detected in the rays from the element beryllium, so the theoretical existence of the neutron came out of the same element. Then as now, all the other atoms were considered to be made up out of combinations of hydrogen atoms and helium atoms. This idea gave an atomic weight of eight for beryllium whereas at that time only beryllium of atomic weight nine was known. Incidentally, since then beryllium eight has been discovered. So it was necessary to assume that each beryllium atom of the nine weight then known contained a neutron in its nucleus or heart.

The neutron is a close combination of electron and proton, the negative and positive units of matter, which is electrically neutral. It differs little from a hydrogen atom in mass. But hydrogen has a unit electrical charge upon its atom and its electron and proton do not make such a closely wedded pair as they do in the neutron.

Neuton is the new name suggested by Dr. Harkins for the new kind of matter which is made up of minute atoms called neutrons. He obtained chemical element zero's name by making its name end in "on" in conformity with the practice used in naming neon, argon, and the other inert gases of low atomic number. Undoubtedly, there will be confusion between neutron, the atom, and neuton, the element, until both words become more a part of the language.

Element zero or neuton is a strange substance which the chemists can never hope to isolate as they do the other elements. As neutrons are very much smaller than any atoms known previously, a lady's thimble tightly packed with neuton would weigh a million tons.

But the new element could not be kept in such a space since it easily passes through any known material. It streaks through the walls of any known container.

Neuton is always leaving earth faster than other elements and it escapes more easily. Dr. Harkins concludes that most of the neuton in the universe is almost certainly in the space outside the planets, sun and stars, although it is concentrated in such bodies by the weak force of gravitation.

Science News Letter, December 3, 1932

AVIATION

Parachutes Useless At Bolivian Altitudes

WHEN you decide to make a descent in a parachute, do not come down in Bolivia.

This advice is gathered from a report of Lieut. A. Y. Smith of the U. S. Army Air Corps. Lieutenant Smith, who recently returned from South America, stated that the Bolivian Air Force does not include the parachute as an item of equipment for its fliers and that many aviators who have attempted to use parachutes in this South American country suffered broken legs and other injuries.

The obvious reason is the high altitude of the greater part of Bolivia. La Paz, the capital of the country, at an altitude of 13,000 feet, is considered the highest capital in the world. Numbers of good landing fields are at elevations of about 12,000 feet. At such heights, which are common near the West Coast of South America, the atmosphere is so rare that a parachute descends dangerously fast.

Landing speeds for planes are unusually high, between 60 and 80 miles per hour, and take-offs require a very long run. Lieutenant Smith said that some planes are equipped with oversized wings in attempt to overcome the high altitude handicap.

Science News Letter, December 3, 1932

GEOGRAPHY

Yale Expedition Maps Unknown Land in Asia

MORE THAN 4,600 square miles of hitherto unexplored country, high in the Himalayas more than 14,500 feet above sea level, have been mapped in detail by the Yale North India Expedition, is the report received by President James Rowland Angell of Yale from the expedition's director, Prof. Hellmut de Terra.

"The geological data amassed tend to prove that Himalaya and Karakorum, the world's highest mountain ranges, possess a geological structure similar to that which characterizes the Alps in Europe, a result which will ultimately lead to a better understanding of the origin of high mountain ranges," Prof. de Terra's report says. "Collections of invertebrate fossils from hitherto unexplored regions will throw new light on the geological history of Central Asia."

Science News Letter, December 3, 1932

VOLCANOLOGY

Intensive Volcano Study Proposed for Central America

Carnegie Institution Scientist Outlines Ideas Which May Eventually Make Eruption Predictions Practicable

THE FLAVOR of your morning cup of coffee may be affected by a volcanic eruption.

Not that it will get a scorched taste from the rolling streams of hot lava, or from the clouds of glowing gas belched forth from the crater. The change is quite likely to be an improvement, due to the good effects of the blanket of granular volcanic ash laid down over the coffee plantations for miles around. This acts as a mulch, holding moisture in the soil, while areas not so covered become dry and barren under the tropic sun.

RUSSIA'S BURBANK

Ivan Michurin, Russian plant breeder, who has for many years been carrying on the kind of experiments that made the late Luther Burbank famous in this country. He has 67 new varieties of apples to his credit, besides many other new fruits and vegetables, many of them special adaptations to the rigors of Russian climate. Recently the Russian town of Koslov renamed itself in his honor, and will henceforth be known as Michurin.

This was one of the intimately human angles of volcanic activity brought out by Dr. E. G. Zies of the geophysical laboratory of the Carnegie Institution of Washington. Other importances of volcanology range through various practical fields to such problems in "pure" science as the study of the orientation of the magnetic field of lava flow. There is some evidence, Dr. Zies said, quoting his associate, J. A. Fleming, that the local magnetic field of a lava flow is determined in its polarity or direction by the condition of the earth's general magnetization at the time the lava was erupted. If this preliminary evidence is substantiated by later work, it may some day be possible to date lava flows from the known state of the earth's magnetic field in the past.

Hope for Prediction

The chief practical point in volcano study, however, is the hope it gives of eventually working out a method for the prediction of eruptions. We are still far from this, Dr. Zies stated, but enough has been done to justify a hope that it can yet be accomplished. When predictions are undertaken, they must be reliable, for the unnecessary terror caused by the prediction of an eruption that fails to come off would be second in evil only to failure to predict one that does happen.

The working out of a practical prediction method will depend entirely on amassing continuous and connected data over a long period of years, Dr. Zies pointed out. This will have to be done, not by short-lived expeditions to the neighborhood of some spectacularly active volcano, but by settling down in the neighborhood of an active volcanic field with a staff of competent scientists and carrying on the work as a regular laboratory project.

Central America, Dr. Zies declared, offers at our own back door the best imaginable field for such an intensive study of volcanoes in all phases of their activity. It contains the greatest concentration of volcanoes, both active and long-extinct, in all the world. Among the active craters is the famous Izalco, the most active volcano known; it erupts every half hour, and about every two years sends forth a lava flow. Contrasted with this are volcanoes so long extinct that all traces of their craters are eroded away and deep gorges have been carved in their slopes.

Organization Suggested

His suggestion was that some agency, either an already existing scientific foundation or a cooperative group of volcanologists with a central administrative organization, go into the field with a definite program of work in view, to cover a long stretch of years. Under a scheme like this, he feels, an encouraging beginning can be made toward a fuller understanding of volcanoes and the eventual ameliorating of their terrors for mankind through foreknowledge.

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RADIOLOGY

Wax Model Helps Fix Dosage of Radium

MEASURING the intensity of radium applied externally for treating cancer in the head or neck is a problem that one British hospital has attempted to solve by use of wax models.

A life-size human head has been built up in a series of sections about one-third of an inch thick. Each is cast in wax of very nearly the same density as the soft tissues, and superimposed on the top and bottom surface of each section is a photograph of the anatomical structures occurring there. If the actual radium applicator used on the patient is applied to the model it will affect a photographic film inserted at any particular level where the dosage is in question so that after development its relative intensity can be measured.

In the report summarizing the results of research work in the treatment of cancer by means of radium lent to selected centers in Great Britain where this is mentioned, the Medical Research Council states that although new lines of technique are being explored it cannot be said that any one method has yet been devised and tested which gives the fullest scope to radiological methods.

Science News Letter, December 3, 1932

PHYSICS

"Quicker'n A Wink"

New Photographic Method "Freezes" Fastest Motions; Useful in Studies of Most Varied Physical Phenomena

By DR. FRANK THONE

See Front Cover

QUICK as a wink is a great deal too slow.

This proverbial epitome of speed is beaten a dozen times over by the newest trick in scientific high-speed photography, which can take thirteen "frames" of motion pictures of a human eye during the fortieth of a second it spends in getting shut. It doesn't even need to extend itself in doing it, either, for it is able to make a perfectly clear and sharp picture in a hundred-thousandth of a second.

The new apparatus has been developed at the Massachusetts Institute of Technology by two engineers, Dr. H. E. Edgerton and K. J. Germeshausen. It can be used for either motion pictures or "stills," or for visual observation of rapid revolving or vibrating machinery.

The new method was not evolved just for amusement. Wink-measuring was done just as a stunt, to show how fast it can work. It is expected to earn its way in the world by aiding engineers in the study of such things as the fast-whirling rotors of electrical machines, the surging springs of automobile valves, the mechanisms of motion picture projectors—all those thousand important mechanical motions that are only a blur to our unaided eyes. It will be of use also in the scientific laboratories where the basic principles underlying all these machines are being investigated, both for further improvements and for the increase of human knowledge for its own sake.

The new device is not a camera, does not concern itself at all with photographic technique. Any old kind of a camera can be used with it, provided it has a decent lens and a fast film. The invention of the "Tech" engineers concerns itself with the other half of photography—the light source. It is simply a means of getting a full blaze of light on and off again in a hundred-thousandth of a second, and of timing that brief flash so that it will come exactly when needed, and as often as needed.

Ordinary cameras, both motion-picture and still, assume a steady source of light—the sun, Kleig lamps, or what have you. They slice off bits of this unending flow to suit their own convenience by adjusting the shutter time.

But a camera shutter is a mechanical device that requires time—even though a very short time—to operate. For some of the very fast motions in the mechanical world no shutter can be made to open and shut fast enough. Why not, then, devise a light that can be turned on and off with extreme quickness, thus delivering it to the camera already sliced up and thereby doing away with the need for a shutter?

Compact and Portable

This was the problem to which the two engineers addressed themselves. They were not in wholly unexplored territory. High speed photographic apparatus had been built several times in the past, some of it fast enough to catch bullets as they came out of the muzzles of guns. But this apparatus was elaborate and usually bulky, and anything that was to be studied had to be brought to it. Dr. Edgerton and Mr. Germeshausen wanted something compact and portable, that could be carried into the shop, the laboratory, the studio, and pointed anywhere, at anything. Their success in constructing such a machine marks the beginning of a new epoch in the scientific study of things that happen quickly.

The problem which the two engineers faced was twofold. First, there must be some kind of light that reached full brilliancy and then went to complete extinction in the smallest fraction of a second. Ordinary lamps wouldn't do: you can see them light up and fade out with the unaided eye. No hundred-thousandth-of-a-second work there!

An electric spark would do the trick. The spark that leaps across the gap in a spark-plug does so practically instantaneously. So does the much bigger spark we call a lightning-stroke, leaping the half-mile gap between a cloud and the earth. Good photographs can be taken by lightning, and good photographs can be made in the laboratory with artificially produced electric sparks. For some kinds of work sparks can be used with the new apparatus.

But for most purposes a steadier, more controllable light was desirable. The two engineers turned to the mercury vapor lamp. Lamps of this type consist essentially of a tube from which almost all the air has been pumped, and into the vacuum a little mercury vapor is introduced. Most lamps have a puddle of mercury as a part of their regular makeup. When electricity is discharged through this mercury-filled partial vacuum, it causes the vapor to shine with an intense bluish-violet light, especially good for photographic purposes. Also, a vapor lamp of this type flashes on and off just about as quickly as an electric spark.

The second part of the program was to get a lot of electricity piled up, and then to dump it through the spark gap or vapor lamp in as short a fraction of a second as possible, to make the light highly intense as well as practically instantaneous. For this, the right kind of a condenser was necessary. Under natural conditions, a cloud, an area of ground, serve as condensers, which eventually discharge through a lightning stroke. On a smaller scale, something of the kind was done artificially in the new apparatus. A sufficient electricity-accumulating surface was provided, with means for letting its load dump suddenly into the mercury vapor lamp at the will of the operators. This was so adjusted that it could be charged and discharged a thousand or more times a second, giving a brilliant flash of light each time the charge leaped through.

A Versatile Lamp

The application of this fast-flashing lamp is simple. There are several ways of making it work. One or two examples will suffice for illustration:

You have an electric motor spinning at a rate of 1800 revolutions a minute. You want to see how its rotor is working. You attach an electric contact to the shaft, so that every time it turns over it sets off the vapor lamp. The lights lasts only a hundred-thousandth of a second, while the rotor is in one position. The rest of the time it is dark.

But since that flash comes 1800 times a minute, it seems practically continuous light to the human eye, and you see the spinning rotor as though it were standing still. You can take photographs of it as though by sunlight.

A different kind of a problem: You are a golf ball manufacturer. You want to know what happens to your product when Jones or Sarazen takes a whack at it. This time independent means are provided for making the light flash on and off again several hundred times a second. A light wire electric trip is set just in front of the teed-up ball, so that the club-head will brush it a split-second before it strikes the ball and thus turn on the light.

Alongside is a motion picture camera, with the mechanism modified so that the film will run continuously, not with the start-stop motion used for ordinary purposes, in which the film has to be stopped while the shutter opens and closes, and then moves on again. In this camera the film keeps moving, but is timed with the light so that one "frame" will be exposed each time the light flashes.

LIKE A CRYSTAL ORNAMENT

Water pouring out of a faucet, "frozen" in its fall by camera that gets pictures in a hundred-thousandth of a second.

You swing. The light flashes on, the ball sails off; after a moment the camera stops. The job is done. When the film is developed, this is what you see: At the moment of impact, the ball flattens —flattens most decidedly against the club. It squeezes out, up-and-down, into a slightly egg-shaped form. Then, as it leaves the surface of the club, its good resilent rubber reacts, and it flattens and widens in the other direction, becoming egg-shaped on its crosswise axis. Then a second reaction sets in, and the vertical axis lengthens out a bit, but not so much as on the first compression. All these changes, studiable in detail, take place before the ball has got half an inch away from the face of the club!

These are only a couple of the many possible diverse uses to which the new apparatus can be put. Doubtless new ones which the inventors never dreamed of will develop as new investigators turn this new tool on their problems.

Even the "stunt" photographs they made with it while it was still in the developmental stage show curious and often beautiful effects. One can see, for example, how the splash a drop of liquid falling on a hard surface produces differs from that produced by a drop falling on a liquid surface. The drop falling into a film on a hard surface raises a thin rim around a cleared circle. The rim is lifted at even intervals into sharp little points, each crowned as with a bright pearl!

Solid Inflexible Water

The drop falling into a puddle, on the other hand, first makes a little depression or crater. Then the sides of the crater rush towards the bottom. They produce there a sharp little point or spine; it leaps upward so violently that it throws several tiny droplets straight up into the air.

Another curious and beautiful photograph was made of water pouring out of an ordinary kitchen faucet. So fast was the photography that the jet of liquid seems to be as solid and inflexible as the glass it is filling.

The golf club came into action again when the break-up of an electric lamp was studied. The lamp was screwed into a socket on the floor, and the club shattered it, striking it in the neck. The photograph shows that an electric lamp does not break all over at one "pop", as it sometimes seems, but that the major break comes first where it is hit, and the cracks spread over the rest of it, with something of a lag the farther they get away from the club-head.

Even these so-called "stunt" pictures suggest possible uses, both in technology and in straight research. Golf balls are not the only things that have to "stand and take it". There are all sorts of machine parts that have to stand up to hard blows, and either resist them or bend just the right amount and in the right direction before them. Automobile valve springs, for example. And the new method has already been applied to the study of the valve-spring problem, to show how the spring action travels in waves.

A Hint for Astronomers

Even the falling, splashing drops of liquid carry much promise for both engineering and physics. Things we do not know as yet about the speed and efficiency with which dropping oil spreads over bearings which it is to lubricate, or dropping water over surfaces it is supposed to keep moist, will doubtless be revealed by further studies of falling drops. Physicists can probably make use of strobo-movies of drops to gain more accurate knowledge of the viscosity, or "thickness", of liquids.

There may even be a hint for astronomers in the curious up-darting of a pointed "spine" when a drop falls into a mass of liquid. In many of the "craters" on the moon there are solid central spines that look like giant replicas of the tiny points in the strobo-movies. One theory of the origin of lunar craters holds that they were caused by huge meteorites splashing into the moon, either while it was still a semi-liquid mass or else partially liquefying the lunar crust at the point of impact. A study of these "splash-spines" might be worth while for the students of the skies.

The possibility of getting a dozen serial photographs of the same wink or other quick muscular action may prove valuable to physicians. It is not unlikely that a man with St. Vitus' dance or some other nervous disease will wink, or snap his fingers, or tap with his toe, quite differently from a normal person's corresponding action. It may be that future diagnosticians will study strobo-movie wink analyses as they now study pulse rates or knee-jerks.

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INVENTION

"Electric Eye" Now Bosses Machine for Sorting Eggs

EGGS can now be separated into the good and the bad, and even graded into as many as a hundred phases in between, by means of a new photo-electric-cell candling machine invented by Wheaton C. Ferris, a St. Louis real estate dealer. The device is said to work more rapidly and far more accurately than the best professional "egg candlers," who are now employed by commission houses to sort eggs by looking through them at a light.

Years ago, Mr. Ferris was in the general merchandise business in a small town. He bought eggs from the farmers and candled them himself. Even after he changed his occupation the memory of that tedious task stuck with him, and at last he hit upon the scheme of putting the light-sensitive photocell in place of the human eye, and automatic handling machinery in place of the human hand.

A separate problem was the prevention of eggs from cracking as they dropped out of the chute into the machine. He finally solved this by installing a rubber ring within a steel one, with an annular space between. A low-pressure blast of air is kept blowing through this, forming a cushion of compressed air on which the eggs fall.

In a test which pitted the automatic action of the machine against the judgment of an experienced egg candler, the machine passed as good several eggs which the candler rejected as bad. When the eggs were broken they proved to be good: the photocell was the better judge of quality through the eggshell.

Science News Letter, December 3, 1932

ENGINEERING

New Liquid Insulator Devised for Transformers

REJUVENATION for a "vital organ" of electrical transmission systems that cover the country is contained in a new kind of transformer oil developed in laboratories of the General Electric Company.

The transformer, by which voltage can be stepped up or reduced, is the key to the distribution of electricity far from the power plant. Most transformers are insulated with mineral oil, which will easily mix with water and thus lose its insulating ability.

Water separates from the new product twice as fast as from mineral oil, F. M. Clark stated in the *Electrical World*, and the demulsified water rises to the top of the insulating fluid.

It is claimed that danger of fire and explosion is less with the new insulator because its decomposition products are non-combustible gases. When broken down by an electric arc, mineral oil yields hydrogen and hydrocarbons that form explosive mixtures with air.

The liquid insulator consists of synthetic organic dielectrics of varying physical and chemical properties and is produced in several different forms.

Science News Letter, December 3, 1932

ASTRONOMY

Check-up Shows Leonid Meteors Numerous

METEORS of the Leonid shower were more numerous than astronomers believed, after their nights of disappointing vigil in mid-November. This is indicated by a check-up made by Prof. Charles P. Olivier, director of the Flower Astronomical Observatory of the University of Pennsylvania.

In a report to Science Service, Prof. Olivier said:

"Excellent reports from observing parties from Boston University, under Prof. L. A. Brigham, show for the night of Nov. 15-16 a total of 252 meteors for four observers, facing different directions, in five hours; and of 417 meteors for four observers in six hours, these latter situated some distance from Boston.

"From State Normal College, East Radford, Va., a very large party under Prof. Paul R. Burch, counted (including duplicates) 734 meteors in three hours; the largest average being 34 per hour each for three different observers.

"From 'Lavorika,' Catskill Mountains, N. Y., the party under J. A. Kingsbury observed 901 meteors that same night, including duplicates. The party consisted of 25 persons, with a variable number of observing.

"It will therefore be seen that the numbers observed in Iowa were well equalled by parties in New York, Massachusetts and Virginia. This does not in the slightest infer that others were not equally fortunate but these are reports from large parties, already examined in some detail. Although 50 reports from 21 states have arrived."

Science News Letter, December 3, 1932

IN SCIEN

METEOROLOGY

Mountain-Top Wind Makes Balloons Go Down

WHEN WE FILL a balloon with hydrogen we expect it to ascend, but when the observers on Mount Washington fill one they expect it to descend. The wind goes over the peak of the mountain and down the lee side so fast that the balloon, even though inflated to rise ten feet a minute in still air, is forced down by the wind.

On quiet days the balloon behaves, and a good "run" is the result. On windy days the balloon just drops out of sight into the clouds below. Later it may be seen asserting itself after the wind has taken it away from the mountain. One balloon plunged downward into a cloud, then rose out of it, but the observers could not train the theodolite on the balloon, for while it was out of sight frostwork covered the lens.

Science News Letter, December 3, 1932

SOCIOLOGY

24 Minutes Per Job Required for Placement

IT TAKES an employment office just fifteen times as long, on the average, to place an engineer in an existing vacancy as it does to fill an employer's request for a laborer, Dr. W. E. Parker of Rochester, N. Y., has reported.

In an effort to work out most desirable methods for employment offices, records have been kept in Rochester of the time required for every activity necessary in bringing the job and the applicant together. A single card is filled out for each "job order" and on it the placement officer records his telephone calls, correspondence, interviews, and so on, including a time record of each thing he does. An average of twelve minutes is required to fill a request for a laborer, either man or woman. An average of 180 minutes is necessary to place a qualified technical employee. The average for all positions is 24 minutes.

Science News Letter, December 3, 1932

NEW FIELDS

CHEMISTRY

New Chemical Treatment Makes Fabrics Crease-Proof

WOOL CLOTH does not crease, muss, or wrinkle as easily as rayon or cotton. From England comes the information that a method of producing creaseless rayon has been developed.

Textile experts have considered that taking the crease out of rayon is one of the most progressive steps that could be made in improving the "artificial silk" of cellulose obtained from cotton or wood.

The crease-preventing process that has been invented and patented in England was the result of fourteen years of laboratory experimentation by a Manchester textile concern.

The method of the anti-crease process calls into service another of the chemist's synthetic products that cause the industrial revolutions of today. A synthetic resin does the trick. Yarns and fabrics of various textile fibers, not alone rayon, can be made uncrushable by impregnating them with a synthetic resin that is mainly distributed within the individual fibers.

Science News Letter, December 3, 1932

PHYSICS

Moon's Pull Measured By New Gravity Balance

A NEW INSTRUMENT for measuring gravity so sensitive that it detects the attraction of the moon was explained to the American Physical Society meeting at the University of Chicago by its inventor, Dr. Kenneth Hartley of Houston, Texas.

Measurement of gravity to within two or three parts in a million, which corresponds to two or three feet of difference in elevation, is of value in prospecting for oil and valuable minerals. Dr. Hartley made his gravity balance with that end in view but it has proved to be so sensitive that it has an accuracy ten times the best work done by the pendulum apparatus of the Coast and Geodetic Survey with which official gravity values are determined.

The attraction of the moon registered on the Hartley balance agreed with the vertical part of the moon's pull upon the instrument as computed theoretically. Making readings each hour during a complete cycle of the moon's journey around the earth, which takes a little less than a month, Dr. Hartley found that the moon's attraction has a period of 24.8 hours and that the 12.4 hour period found in the tides is not present. Another puzzling discovery was a small lag in time of the recorded values as compared with those mathematically expected. This has not been explained.

The Hartley gravity instrument uses the elasticity of a spring in measuring gravity. The only previous successful methods have used some form of pendulum for determining the acceleration produced by gravity. With the type of pendulum apparatus used by the government engineers, gravity can be accurately determined in only three or four places in a month, while Dr. Hartley claims that he can ascertain gravity at three places within an hour if the weather is reasonably good.

Science News Letter, December 3, 1932

CHEMISTRY

New Method Measures Water Held by Flour

HOW MUCH water can flour soak up?

This question, of obvious importance to millers, bakers, and everyone who works with flour, can be answered with the help of a new method developed by Dr. Earl B. Working of Kansas State College.

A quantity of flour is mixed with six times its weight of water, and whirled in a special centrifuge. An additional four parts of water is added, to make sure that all the flour is washed in.

After centrifuging, the flour remains in the bowl of the centrifuge as a dough. The bowl and dough are weighed together, then the weight of the bowl and the original weight of the flour subtracted. The difference represents the weight of water which the sample of flour is able to hold. This differs, of course, for different wheats, methods of milling, storage conditions and other factors.

Dr. Working's method has been used on over 200 samples of flour from all over the United States and Canada, and is regarded as quite successful.

Science News Letter, December 3, 1932

ARCHAEOLOGY

Aegean Cities 3400 Years Ago had Common Language

DWELLERS in the brilliant cities that stood around the shores of the Aegean Sea in the fourteenth century B. C., when Tut-Ankh-Amun sat uneasily on the throne of Egypt, had a common language, as they have a common language today. Fresh evidence to this effect was laid before the Hellenic Society in London by Sir Arthur Evans, famous investigator of the remains of the high civilization centering in the royal city of Knossos on the island of Crete.

It has long been known that there was a cultural connection between Knossos and the cities of the Mycenaean civilization on the Greek mainland, but whether they had a common tongue or whether, like modern European nations, they shared a culture though speaking alien languages, has never been clear.

Now Sir Arthur, by examining an inscribed vessel discovered by Prof. A. D. Keramopoulos in Cadmean Thebes, has found proof of identity in language in similarities between the letters of the Cadmean inscription and writings found in Knossos, and also in the close correspondence between personal names used in the two cities.

Science News Letter, December 3, 1932

PHYSICS

Electrons Promise to Reveal Secrets of Matter's Heart

STREAMS of electrons, the ultimate particles of electricity, when shot through crystals promise to reveal some of the secrets of the heart of matter, the atomic nucleus.

Drs. K. Lark-Horovitz and H. J. Yearian of Purdue University reported to the American Physical Society meeting in Chicago that they have found unmistakable evidence of the role that the nucleus of the atom plays in the diffraction of electrons by crystals.

Whereas the X-ray method of crystal pattern study shows only the behavior of the electron cloud around and outside the heart of the atom, the electron waves are strongly influenced by the charge of the nucleus of the atom itself. This effect showed in the Purdue experiments as a difference in the intensity distribution of the scattered electron waves as compared with the X-ray pattern.

Science News Letter, December 3, 1932

INVENTION

The Linotype

"A Classic Invention"

Though Taking Its Name From Another of Its Machines Our Daily Press Owes Its Being Also to the Linotype

MACHINE FOR PRODUCING LINOTYPES, TYPE-MATRICES, &C. Ottmar Mergenthaler, of Baltimore, Maryland. Specification forming part of Letters Patent No. 436,532, dated September 16, 1890. [First Patent on the linotype No. 317,828, dated May 12, 1885.] This is an exact reprint of extracts from the 1890 patent.

To all whom it may concern.

BE IT KNOWN that I, OTTMAR MERGENTHALER, of Baltimore, Maryland, have invented certain improvements in Machines for Producing Linotypes, Type-Matrices, &c, of which the following is a specification.

The present invention relates to a machine for producing what are known in the art as "linotypes"—that is to say, bars for types, each having on one edge the characters necessary to print an entire line of a page or column.

The present machine is of the same general character as those represented in numerous Letters Patent heretofore granted to me—such, for example, as Patent No. 317,828, dated May 12, 1885, and No. 378,798, dated February 28, 1888, but more particularly to that form of machine represented in my application for Letters Patent of the United States filed on the 15th day of March 1889, Serial No. 303,396.

Like its predecessors, the present machine contains as its fundamental features a series of independent female type or matrices and a series of space-bars. The matrices and space-bars properly assorted are contained in magazines or holders. A series of finger-keys representing the respective characters and the space-bars act, in connection with suitable composing mechanism, to assemble the matrices in line in the order in which they are to appear in print, and also to introduce the spaces at suitable points in the line. After the matrices and spaces for an entire line are assembled a shifting mechanism transfers them to the front of a mold, the internal form and dimensions of which correspond with those of the required linotype. While the line is thus located in front of the mold suitable clamping devices act thereon and the space-bars are advanced through the line, so as to "justify" the same. A melting-pot containing constantly a large body of molten metal is arranged to close the mold on the rear side, and at the proper moment a pump in this pot acts to deliver the molten metal into the mold, where it solidifies and produces a linotype, which receives on its edge the impression of the matrices at the front. As soon as this casting operation is completed the clamps lift the matrices from the front and the space-bars are then separated mechanically from the matrices and return to the magazine from which they started, while the matrices are carried to a distributing mechanism at the top of the machine, where they are assorted and returned to the upper ends of the appropriate magazine-tubes. After the removal of the matrices therefrom the mold makes a partial revolution and an ejecting device delivers the linotype therefrom to a galley or receiver. It will be observed that the matrices and space-bars are first assembled, then presented to the mold, and finally returned to the points from which they started, to be again used. The operations of assembling or composing one line of casting from the preceding line and of distributing a third line are carried on concurrently and independently.

The present invention relates to various improvements in the construction of the magazines; in the escapement devices for delivering the matrices from the magazine; in a finger-key mechanism and mechanical devices to continue the action of the finger-keys if they are not fully depressed by the operator; in various details of the shifting or transferring mechanism by which the assembled line is presented to the mold; in means for separating the matrices from the space-bars and transferring the matrices to the distributing mechanism, and in various details connected with the distributer.

In the drawings, Figure 1 is a front elevation of my complete machine.

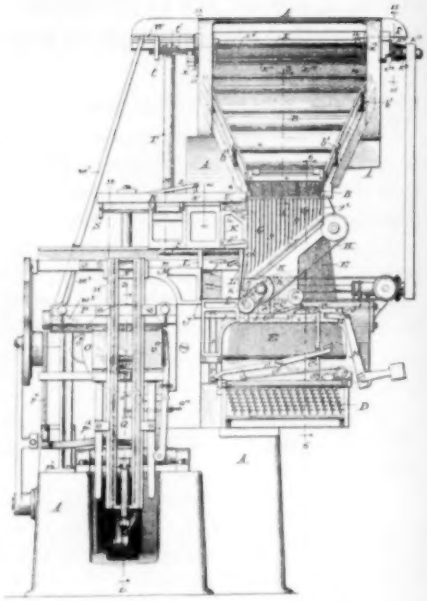
General organization.—A represents a rigid main frame, which may be of any form or construction adapted to sustain the operative parts herein described.

B is the magazine in which the assorted matrices are contained.

D are finger-keys representing the respective letters or characters, and connected by rods E with the escapement mechanism located in the mouth of the magazine to deliver the matrices one at a time therefrom.

G G are a series of upright slots or channels through which the matrices descend.

H is an inclined traveling belt on



INVENTOR'S DRAWING

of the complete linotype machine which sets the type molds, and redistributes them, after casting metal type in them, a line at a time.

The Linotype was patented two years earlier than the other great typesetting machine, the Lanston Monotype, which will appear soon as another Classic Invention.

which the matrices are received and by which they are delivered to the vertically-movable assembling-block I, against a yielding resistant J.

K is a reservoir or receptacle in which the space-bars are held, and from which they are dropped, one at a time, into the assembling-block I.

LL' are transferring or shifting arms, which carry the matrices from the elevated assembling-block through a stationary guide-block M to a vertically-movable yoke N, by which they are first lowered to the vertical mold-wheel O, and thereafter lifted within reach of the assorting devices.

P is the "vise," so called, a frame supporting the matrix-clamps and sliding mechanism Q operating the space-bars.

R are stationary rails or supports to receive the line of matrices and space-bars.

S is a slide to transfer said line to said rails from the yoke N after the latter is elevated.

T is a vertically-swinging arm provided with means for lifting the matrices from the rail R to the distributer, leaving the space-bars behind.

U is a device for carrying the space-bars from the rails into their receptacle or magazine K.

W is a slide at the top of the machine to carry the matrices from the lifting device T into the distributer X, whence they return to the magazine.

Operation.—The machine is operated as follows: The attendant depressing successively the finger-keys, which represent the required characters, thereby causes the matrices to be discharged from the mouth of the magazine B, whence they descend through the channel G to the belt H, by which they are delivered one after another in an upright position side by side into the assembling-block I, in which they are advanced in close order by the rotary block b^2 acting against the last matrix. From time to time space-bars are delivered into the line by means of the appropriate finger-key. After the composition of the line is completed the assembling-block I is lifted and the line of matrices thereby carried within the grasp of the shifter-arms LL', which immediately carry the matrices to the left through the guide M into the yoke N, which at once descends with them to the front of the mold, which assumes it normal position. As soon as the matrix-line has completed its descent, the mold moves forward toward the matrices. The first steps in the justification—that is to say, in the lifting of the space-bars—now occur. It is frequently desirable to have the machine cast a number of bars in duplicate from the one line of matrices before they are distributed. This is accomplished by the use of a latch a^{20}, (shown in Figs. 1, 36, 43, and 45,) pivoted to the main frame, so that it may be set at will in the path of slide U to lock the same in its extreme position at the right of the machine. As this slide is connected by the intermediate parts with the slide S, the latter is prevented from moving to the right, and thus prevented from shifting the matrices out of the yoke when the latter rises. Thus it is that the matrices are again presented by the yoke to the mold without being distributed. The pot advances against the rear face of the mold, the matrices are tightly clamped, the justification completed, and the pump acts to fill the mold with molten metal. The justifying devices now descend, the pump-plunger is lifted, the melting-pot recedes from the mold, and the mold recedes from the matrices. The mold revolves to present the contained linotype in front of the ejector, the elevator-arm T descends to its lower position, and the ejector advances to deliver the linotype. About this time the yoke lifts the matrices and space-bars from the mold to the level of the upper guide R, and the slide S acts to carry the line into said guide to deliver the matrices upon the plate *t* on the end of the arm T. The arm T now swings upward, carrying the matrices, which are shifted by slide W to the distributer, while the hook *u*, moving to the right, carries the space-bars remaining in the guide R to their receptacle K. In due course the matrices will be distributed, the ejector withdrawn, and the mold rotated to its original position. It is to be observed that the operations of assembling one line of casting from a second and distributing a third are carried on concurrently.

Science News Letter, December 3, 1932

STRYCHNINE

was discovered by the same team of pharmacologists who isolated quinine.

Pelletier and Caventou

will describe their methods

IN THE NEXT CLASSIC OF SCIENCE

ARCHAEOLOGY

Contorted Human Forms Adorn Temple at Monte Alban

STRANGE people lived in Monte Alban, Indian city of treasure tombs and secret passages.

On the walls of a temple now being unearthed by Mexican archaeologists, appear carved human figures in inexplicable postures. Some of the persons shown here are crawling or swimming. Some lie on their backs. One lies in an abandoned pose, head thrown back, and with an object to his lips as if he were drinking. Sex is in many cases emphasized, as if it had special significance here.

Some of the figures appear crippled. One archaeologist suggested that the scene represents sick people going to some sacred shrine of miraculous healing. But to other archaeologists, the contorted figures recall religious rites of Zapotecan Indians. Monte Alban was a Zapotecan city.

Early Dominican monks who lived among the Indians in this part of Mexico left descriptions of the rites of the Zapotecans. During sacred celebrations, they said, Zapotecan high priests drank the holy but fermented juice of tropic fruits which was forbidden to the common herd. The priests then danced, twisting their bodies into horrible shapes and groaning so frightfully that the ordinary worshippers were terrified.

During these religious functions, too, the priests were expected to break their ordinary vows of celibacy in order to provide for their succession.

The temple on which the gyrating figures are carved was named "The Temple of the Dancers" years ago, when treasure hunters probed the earth-covered mound in which the temple lies buried, and found a tunnel inside. The tunnel had a lining of stone slabs carved in human figures in curious, dance-like postures.

The first paintings known to have

been done by Zapotecan Indians have been found within an oddly-shaped tomb, apparently guarded by a headless skeleton. Paintings in red, green, and yellow cover the front of the tomb. There are more underneath the lintel, on the door jambs, and on the stone floor of the entrance.

Already, the archaeologists have identified those on the lintel front as Zapotecan picture writings dealing with the calendar. The central one is read as "Twelve Flower" which was either the name or the date, as Mexican Indians were called after their birthdays. Other picture writings painted on the tomb represent year and day names in Zapotecan or in Mayan.

Science News Letter, December 3, 1932

ENGINEERING

Sand and Weather Affect Life of Auto Tires

WHEN a visiting motorist tells about the good mileage his tires give him, which happens to be a better figure than you can boast for your own car, do not immediately become disgruntled with your dealer and the kind of tires you are using.

For sand and weather may be the cause of the mileage difference.

Suppose you live in Florida, and the visitor in Akron, Ohio. Because the sand used in making roads in Florida is sharper than that near Akron, the tread of your tires will last only 60 per cent. as long as in northern Ohio. This is the estimate of Burgess Darrow, manager of the development department for the Goodyear Tire and Rubber Co., which was given in a paper read before the Society of Automotive Engineers.

Mr. Darrow stated that tires of the Arizona motorist, whose roads are built with smooth desert sand, will last 60 per cent. longer than those of the Akron resident. Thus, for all sand has to do with it, tire mileage in Arizona is almost three times as great as in Florida.

But sand is not the only thing that causes tires to wear. The temperature at which a tire operates has a lot to do with the length of its life. Mr. Darrow's paper estimated that motorcoach tires which give 28,000 miles in such northern states as Ohio, Michigan and Minnesota will last for only 20,000 to 22,000 miles in the South.

It was also pointed out that hills and curves have an important effect on tread wear.

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BIOGRAPHY

A New Introduction to The Father of Bacteriology

IT IS NOT OFTEN that one can meet a modest but great explorer of a new world who was born 300 years ago, yet Clifford Dobell, F.R.S., protistologist to the Medical Research Council, London, arranges the introduction pleasantly in his erudite and charming volume: Antony van Leeuwenhoek and his "Little Animals" (Harcourt, Brace and Co.).

A draper by trade, Dutchman by nationality, maker of lenses and inquisitor of the microscopic world by desire, Leeuwenhoek was the father of protozoology and bacteriology. Devoting only spare time to the "very little animalcules" that he probably first found in the water of an inland lake in 1674, he reported all his interesting observations in letters to the Royal Society of London, which was not very old at the time. His famous "Letter on Protozoa," his eighteenth scientific epistle to the Royal Society, dated "Delft in Holland, 9th October 1676," has been translated by Dr. Dobell in full for the first time. This will amaze the thousands of scientists who are studying the protozoa and bacteria that Leeuwenhoek first saw. Only a part of the letter was published in the Philosophical Transactions in 1677 as "English'd" by the energetic and first Royal Society secretary, Henry Oldenburg. This famous document, still preserved in the Royal Society's archives, has been long regarded as the first paper ever written upon protozoology, and Dr. Dobell, who patiently translated it out of its difficult Dutch script, discovered that it also contains the first account ever written of the bacteria as well as many other original observations.

With rare discernment the Royal Society elected Leeuwenhoek a fellow. It must be remembered that he was a Dutchman and not long since England and Holland had been at war. This international rapport in science has a lesson for today, as Dr. Dobell interprets:

"In reintroducing plain Mr. van Leeuwenhoek, the Dutch draper and amateur micrographer, I want also to impress upon you that there are still blood-brothers in every different nation. Barriers erected by birth and prejudice and education are blown sky-high before the fire of common human aims and interests. Language and land and lineage are no bars to mutual and native understanding. An honest man in any country is linked to all other honest men in all other countries. When a true man like Antony van Leeuwenhoek is born, the heavens are opened. Even when he dies he is not dead; his spirit glows with the divine light forever, and will forever be seen and understood—somewhere, sometime, by somebody. No Princes, Popes, politicians, or even prophets, can unite mankind in universal brotherhood; but the disinterested and simple men everywhere can (and perhaps eventually will) unknowingly draw warring nations together, and may ultimately save humanity from the fate of the Triassic reptiles."

Science News Letter, December 3, 1932

SEISMOLOGY

Gulf of Tartary Gets Second Earthquake Shock

THE REGION around the Gulf of Tartary, off the coast of eastern Asia, got its second earthquake shaking in a fortnight just before midnight on Friday, Nov. 25, according to calculations made by the Jesuit Seismological Association, based on data gathered by Science Service.

The time of origin was about 11:30 p. m., eastern standard time, and the epicenter was in latitude 48 degrees north longitude 141 degrees east. On Nov. 12, an earthquake had been recorded from the same region.

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A shipment of mercury large enough to supply 50,000,000 ordinary thermometers—the commonest use of mercury—has arrived in New York to be used by the General Electric Company in generating power in a new 20,000 kilowatt mercury turbine in New Jersey.

The Field Museum has on exhibit the only complete skeleton ever discovered of the prehistoric South American ground sloth, *Pronothrotherium*.

TUNING IN ON MOSQUITOES

The physics laboratory of the U. S. Public Health Service devised this apparatus, which is similar to radio, in an effort to produce a sound that will attract mosquitoes in large numbers so that they may be exterminated. It will reproduce with unusual purity frequencies from 128 to 7,500 vibrations per second—from far below to far above the range of the human ear. Harold Link, assistant, who worked with Frederick Knowles, assistant physicist, building the apparatus is pictured tuning it. It has not yet been tested in practice.

MEDICINE

Medical Centers Urged to Lower Cost of Medical Care

FOR FIVE YEARS a group of experts have studied to find what is wrong, economically, with medical care in America. They have tried to find why it costs the patient so much to be sick while at the same time many physicians barely make a living.

This week this group of 48 experts, known as the Committee on the Costs of Medical Care, made their final report. Here is the verdict:

"That medical care be furnished largely by organized groups of physicians, dentists, nurses, pharmacists, and other associated personnel, centered around a hospital, and rendering home, office, and hospital care.

"That all basic public health services be extended until they are available to the entire population, according to its needs.

"That the costs of medical care be placed on a group payment basis through the use of insurance, taxation, or both methods, without precluding the continuation of the individual fee basis for those who prefer it.

"That a specific organization be formed in every community or state for the study, evaluation, and coordination of medical service.

"That the professional education of physicians, dentists, pharmacists, and nurses be reoriented to accord more closely with present needs, and that educational facilities be provided to train three new types of workers in the field of health; namely, nursing attendants, nurse-midwives, and trained hospital and clinical administrators."

Two minority reports were presented by members of the committee who could not conscientiously subscribe to the views of the majority. The largest group of dissenters urged that government competition in the practice of medicine be discontinued and that the general practitioner, the old-time family physician, be restored to his central place in medical practice.

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BIOGRAPHY

American Astronomer Gets Royal Society Medal

DR. GEORGE E. HALE, director emeritus of the Mt. Wilson Observatory, Pasadena, Calif., has been awarded the Copley medal of the Royal Society of London, for his work on the magnetic field of the sun. Two Germans were also honored with Royal Society medals. Dr. Fritz Haber, who last year was a Nobelist, will receive the Rumford medal in recognition of his work in the application of thermodynamics to chemical reactions, while Prof. R. Willstätter of Munich, who has done notable work on the way in which plants manufacture foods, will be presented the Davy medal.

Dr. J. Chadwick of Cambridge, who this year demonstrated the existence of the neutron, was awarded the Hughes medal. Royal medals were awarded to Prof. R. Robinson of Oxford University for his work in organic chemistry and to Prof. E. Mellanby of University of Sheffield, for his work on dietary factors, especially on rickets.

Dr. C. E. Correns, director of the Kaiser Wilhelm Institute for Biology, Berlin-Dahlem, Germany, will receive the Darwin medal for his researches in genetics. Dr. Correns is one of the three men who in 1900 re-discovered the scientifically revolutionary researches of Gregor Mendel.

Dr. Torwald Madsen, director of the State Serum Institute, Copenhagen, Denmark, will be decorated with the Buchanan medal for his work on immunity, especially in relation to diphtheria antitoxin.

Science News Letter, December 3, 1932

PUBLIC HEALTH

Cleanliness Prevents Skin Inflammations

PERSONAL cleanliness is an important means of preventing inflammations of the skin acquired by industrial workers in the course of their work, says Dr. Louis Schwartz of the U. S. Public Health Service.

About half of all compensation claims are for cases of the condition known as dermatitis, which covers skin inflammations and diseases. About 100,000 cases of occupational dermatitis occur throughout the United States in one year, conservative estimates show.

Science News Letter, December 3, 1932

PSYCHOLOGY

Elimination of Unsafe Drivers Impractical to Cut Accidents

REDUCTION of traffic accidents cannot be achieved by eliminating unsafe drivers. That is impractical, but much can be done in the way of improving driving conditions and so making safe driving as simple and easy as possible for all drivers, Dr. Knight Dunlap, of Johns Hopkins University, and chairman of the Committee on the Psychology of the Highway of the National Research Council, said in a report published in the *Scientific Monthly*.

Dr. Dunlap does not approve of the introduction of elaborate psychological tests for applicants for a driver's license, in order to eliminate the unsafe driver.

"Theoretically, tests could be devised for the identification of the worst of these classes," he said. "I do not even doubt that the tests could be developed practically, if a number of competent psychologists devoted their energies to it.

"The application of such tests, however, is another matter. We know the difficulty in keeping even the simplest tests up to standard, and we know that the administration of complex tests of sufficient precision to be determinative of mental conditions would require a vast army of skilled experts who are not available and will not be available. Under any other conditions of administration such tests would be a mere stench."

For improvement in driving conditions Dr. Dunlap made the following recommendations:

1. Traffic lights must be of colors which can be most quickly discernible by all drivers, including the color-blind. And their form and placement must be worked out on the basis of human beings' habits of perception.

2. Information signs must be conspicuous, but they must not require much reading. The signs now in use to indicate route numbers are cited by the psychologist as good examples of such signs.

3. Dividing lines on the roads don't deter the reckless drivers, but are an aid to the drivers who want to be careful.

4. Cautions and instructions must not be painted on the road surface. They are a distraction to the driver who tries to read them and are hidden by snow or even water on the street.

5. Body designs must be improved to cut windows lower, set the radiator hood down, and give greater depth to the windshield.

6. Road edges must be improved so as to eliminate the hazard to a driver forced off the road and reduce the fear of such a mishap that now leads to unintentional road-hogging.

Science News Letter, December 3, 1932

RADIO

The Science Service radio address next week will be on the subject,

HEALTH EXAMINATIONS AND CANCER

by

Dr. Franklin H. Martin

Director General of the American College of Surgeons.

FRIDAY, DEC. 9

at 12:45 P. M., Eastern Standard Time

Over Stations of
The Columbia Broadcasting System

IMMUNOLOGY

Seeks to Avoid Chills From Anti-Pneumonia Serum

PROGRESS in finding a way to avoid the fever and chills which sometimes follow when antipneumococcic serum is given in the treatment of pneumonia is reported by Dr. A. L. Barnes of the Massachusetts State Department of Public Health. Dr. Barnes found that certain lots of serum produced this reaction while others did not, but he was unable to find any chemical differences in the lots to account for the difference in effect. All were equally potent in combatting the disease.

Science News Letter, December 3, 1932

BOTANY

NATURE RAMBLINGS by Frank Thone

Red Cedar

WINTER is the time of the evergreen trees. In summer, the broad-leaved forest attracts most attention, with its greater versatility in shape and size of leaves, flowers and fruits, but when the other trees stand naked in the winter winds, we look again at the hardy tree folk who keep their leaves green whatever the weather.

Among these not the least attractive, both to admiring humans and to feeding birds, is the red cedar, or to be more meticulously accurate, the Virginia juniper. For the tree we call red cedar is not a cedar at all, strictly speaking; the true cedars are all inhabitants of the Old World, and include only three species: the Atlas cedar of north Africa, the Lebanon cedar of the Holy Land, and the deodar of India. But the name "cedar" has so long been applied indiscriminately to any evergreen tree with odorous wood, and especially to the various species of juniper trees, that there is no use being schoolteachery about it. So we shall go right on making cedar chests, and cedar fenceposts, and cedarwood leadpencils, and cedar oil, out of red juniper trees. And the winter birds that eat the blue berries with the frosty white "bloom" will neither know nor care what the real name of the tree may be.

Science News Letter, December 3, 1932

Because Australia has sent so many helpful insects to Florida and California, to aid in fighting crop pests, the State of Florida recently sent Australia a supply of pumpkin bugs infested with the tachinid fly, hoping that these flies will help Australia to keep down the pumpkin bugs there.

Which Friends?

Which friends would value this as a Christmas Gift?

YOUR CHRISTMAS gifts will be appreciated, of course. But don't you wish you could be sure that they will be just as useful as they will be appreciated.

You would be positive of their usefulness if you could give something that has proved itself to you. Then why not use SCIENCE NEWS LETTER as a "tested" gift for true friends? If its thoroughness, accuracy and brevity have brought you satisfaction and pleasures, these same qualities will be really useful to many whose names are on your Christmas list.

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We wager you have thought of remembering friends with this or some other magazine at the holiday season. But then you may have changed your mind because in giving magazine subscriptions all you could present was an unexciting envelope with a gift card in it! The magazine itself would arrive sometime later in its usual drab covering.

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Biography

ANTHONY VAN LEEUWENHOEK AND HIS "LITTLE ANIMALS"—Clifford Dobell—*Harcourt Brace,* 435 p., XXXII pl., $7.50. For review, see page 360.

Science News Letter, December 3, 1932

History of Science

CLASSIC DESCRIPTIONS OF DISEASE—Ralph H. Major—*Thomas,* 630 p., $5.50. The original descriptions of various diseases by eminent medical authorities are here presented in English, with a biographical sketch and, generally, a picture of the authority. The book is valuable for reference as well as for general reading by those interested in medical history.

Science News Letter, December 3, 1932

Anthropometry

THE MEASUREMENT OF GROWTH—S. A. Courtis—*Brumfield and Brumfield,* 217 p., $2. This book, so far still in mimeographed form, presents a course first tried out in the summer session at the University of Michigan in 1932. The author assumes or accepts the belief that human actions are subject to material laws which are discoverable and may be used to control "living and feeling." He is convinced that the twentieth century will witness as remarkable an advance in this field as the nineteenth century did in the control of physical forces. The present book is put forward as a beginning toward the solution of this problem of "the scientific control of human destiny." Its technical nature makes it suitable only for the prepared student. The author introduces a new system of values, designated as isochrons, which is the subject of a special small monograph accompanying the book.

Science News Letter, December 3, 1932

Entomology

BUTTERFLIES OF THE ALLEGANY STATE PARK—Aretas A. Saunders—*Univ. of the State of New York,* 270 p., 45c. A thorough-going popular account of the butterflies of an interesting Eastern area, with photographic and line illustrations.

Science News Letter, December 3, 1932

Ethnology-Archaeology

INDIANS OF CANADA—Diamond Jenness—*National Museum of Canada, Ottawa,* 446 p., $2.50. One of Canada's best known anthropologists has written this comprehensive and beautifully illustrated account of Eskimo and Indian tribes in Canada. Mr. Jenness tells of the life of these comparatively little-known Indians, their languages, economic conditions, homes, social organization, and other matters. He devotes a chapter to archaeological remains, and another to the important question of Indian origins. The last section of the book is given over to detailed descriptions of the tribes.

Science News Letter, December 3, 1932

Psychic Phenomena

THE SINCLAIR EXPERIMENTS DEMONSTRATING TELEPATHY—W. F. Prince—*Boston Society for Psychic Research,* 138 p., $1.50. An analysis by the research officer of the Boston Society for Psychic Research of the data on telepathy obtained in the experiments of Mrs. Upton Sinclair and published by her husband in the book "Mental Radio." Dr. Prince expresses his belief in the genuineness of the phenomena. A brief history of telepathic research is included.

Science News Letter, December 3, 1932

Ornithology

AMERICAN BIRDS—Frank G. Ashbrook—*Reilly and Lee,* 95 p., $1. A compact little pocket-size popular manual, well illustrated in colors.

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Psychology

THE THINKING MACHINE—C. Judson Herrick—*Univ. of Chicago Press,* 374 p., $3. This second edition of an excellent book has been revised throughout to correct errors, make short additions to the text and to add new titles to the bibliographies with each chapter.

Science News Letter, December 3, 1932

Philology

A DICTIONARY OF THE OSAGE LANGUAGE—Francis La Flesche—*Govt. Print. Off.,* 406 p., 50c. This Indian language dictionary was made possible by the Missouri Historical Society which established an Osage Fund for the purpose. Writing of this in the introduction, Dr. La Flesche expressed the hope "that it may be of use to those who desire a knowledge, not only of Osage, but of the great Siouan family of tongues to which it belongs."

Science News Letter, December 3, 1932

Philology

THE HISTORY OF LANGUAGE—Henry Sweet—*Dent and Sons,* 148 p., 1s 9d. A pocket-sized, almost weightless little book, but crammed with information to the point one almost feels compelled to use a nutpick.

Science News Letter, December 3, 1932

Biography

PIERRE CURIE—Marie Curie—*Macmillan,* 242 p., $2. Translated by Charlotte and Vernon Kellogg. This is the second edition, with corrections, of the story of the co-discoverer of radium. Madame Curie has added some autobiographical notes to her account of her husband's life. Her personality has been happily retained in the translation.

Science News Letter, December 3, 1932

Psychology

THE MIND IN ACTION—A Campbell Garnett—*Appleton,* 226 p., $2. A "study of motives and values" written, as the author tells us, with the principles of Spearman as a starting point, but presenting other important theories.

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Sociology

THE SCIENTIFIC BASIS OF SOCIAL WORK—M. J. Karpf—*Columbia Univ. Press,* 424 p., $3.75. The author has attacked the double problem of determining the case worker's knowledge-needs and his available and possible sources for such knowledge. The book is a serious effort to give greater definiteness to programs of social work.

Science News Letter, December 3, 1932

Psychology

THE MIND IN CONFLICT—R. A. Howden—*Oxford,* 83 p., 85c. A brief popular account of modern methods of approach to mental problems, and modern efforts to solve them.

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Aeronautics

METAL AIRCRAFT CONSTRUCTION—M. Langley—*Gale & Polden, Ltd.,* 240 p., 15s. A technical review for aeronautical engineers which gives the details of theory and practice in metal construction of aircraft.

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